

REMARKS

Claims 1-6 and 16-25 are currently pending. Non-elected claims 7-15 have been canceled without prejudice or disclaimer in order to facilitate prompt allowance of the present application. Claims 16 and 17 have been added to capture recitations deleted from claims 3 and 4, and claims 18-25 are based on claims 1-6, 16 and 17, but take a different approach to claiming the invention in the independent claim.

The Office Action of August 8, 2005 includes an objection to the title as not being sufficiently descriptive. The Examiner is thanked for providing a suggestion for a title, which applicants find acceptable. Accordingly, the title has been changed in accordance with the Examiner's suggestion.

The Office Action also includes an objection to the Abstract of the Disclosure, stating it exceeds 150 words in length. The Abstract has been shortened to be below this threshold.

The Office Action includes a rejection of claims 2, 4, 5 and 6 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Applicants respectfully submit that the claims were sufficiently definite at the time of filing. The Office is concerned that the phrases "Bellmouse *type*" and "double gate electrode *type*" lead to uncertainty as to the claim scope insofar as in the Office's view it is not clear what is encompassed by the term "type." Applicants respectfully submit that the claim language when read in the light of the specification simply means as to claims 5 and 6 that the field emission device is of the type that has a double gate electrode. The claims have been reworded to avoid the term "type" but without changing the scope thereof. Similarly, claim 2 uses the term "Bellmouse type" as a substitute for "Bellmouse shaped" electrode. Again, the term "type" has been avoided by adopting

the language used in the specification, for instance, at page 7, line 26, where the word "type" was replaced with the word "shaped." In light of these changes and remarks, applicants respectfully request withdrawal of this rejection.

The Office Action includes a rejection of claims 1-6 under 35 U.S.C. §102(b) as allegedly being anticipated by JP 7-065706 (hereinafter the Toyoda patent publication). This rejection is respectfully traversed.

The Toyoda patent specification discloses an electric field emission device that has a gate electrode 4 with an opening 4a that exposes the head of the emitter tip 2. The diameter of the opening 4a of the gate electrode layer is smaller than the diameter of the junction with the substrate at the emitter tip. In the manufacturing of this tip, the gate electrode material of the gate electrode layer 4 is "stuck to the diffusion film on the surface of the conical head of the emitter tip 2" such that upon removal of the diffusion film the inside peripheral wall of the opening of the gate electrode 4 extends nearly parallel to the conical head of the emitter tip, allegedly to reduce the operating voltage. However, there is nothing in the Toyoda patent English language abstract which would teach or suggest a fundamental difference of the presently claimed invention.

Specifically, as recited in claim 1, the gate electrode "includes a cylindrical electrode part that *forms a focusing electric field from the gate hole towards a proceeding path of an electron beam.*" (emphasis added) This is illustrated in one embodiment by Figure 5 where a resulting electric lens is shown. This electric lens as explained at page 5, line 23 et seq, forms an electric field using the cylindrical electrode part and focus the electron beam by the electric field. The application identifies that this mechanism is controlled by general electrodynamics, which are

not described in detail insofar as they are well known. What is apparent, however, is that the Toyoda patent specification would not have this effect.

If any electric lens would be formed in the Toyoda device, it would be a diverging lens which would not form a focusing electric field, but rather a defocusing electric field, from the gate hole towards a proceeding path of the electron beam, if it forms any such focusing electric field at all. It is noted that the Toyoda patent specification has for its purpose reducing the operating voltage, and does not identify focusing the electron beam as a function provided by its device according to the English language abstract.

New claims 18-25 have been added to take a somewhat different approach to claiming the invention, i.e., by more clearly defining the actual physical orientation of the cylindrical electrode part relative to the electron emitter. In addition to the distinctions identified with respect to claim 1, for instance, new claim 16 adds further distinctions by this recitation of the physical structure.

The dependent claims will not be separately discussed for sake of brevity. There are some notable differences that are readily apparent, such as the recitation in claim 2 that the Bellmouse shaped electrode part broadens in the direction of propagation of electron beam. The part very near the emitting tip 2 of the Toyoda patent specification actually would not be accurately described as broadening, but rather converging, at the electron tip. With respect to claims 5 and 6, it is not entirely clear how the Office is reading the double gate electrode embodiment of the Toyoda patent specification on these claims. It appears that the Office may be combining the two embodiments shown in the Toyoda patent specification, although this is not abundantly clear. Also, it should be noted that claims 3 and 4 have been modified to

recite only carbon nanotubes, which do not appear to be disclosed in the Toyota patent specification. New claims 16 and 17 have been added to pick up the permutation of the microchips that were taken from claims 3 and 4.

In light of the foregoing, applicants respectfully request reconsideration and allowance of the above-captioned application. Should any residual issues exist, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,

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